

**CPC****COOPERATIVE PATENT CLASSIFICATION****F03B**

**MACHINES OR ENGINES FOR LIQUIDS** (positive-displacement engines for liquid F03C; machines for liquids and gases F01; positive-displacement machines for liquids F04 , rotary fluid gearing of the hydrokinetic type [F16H 41/00](#))

**NOTE**

Attention is drawn to the notes preceding Class F01, especially as regards the definition of "reaction type".

This subclass comprises:

- engines, other than of positive-displacement type, driven by liquids;
- machines, other than of positive-displacement type, for liquids.

**Non-positive-displacement machines or engines characterised by specified type, e.g. water turbines** (adaptations of machines or engines for special use [F03B 13/00](#); controlling [F03B 15/00](#))

- F03B 1/00** Engines of impulse type, i.e. turbines with jets of high-velocity liquid impinging on blades or like rotors, e.g. Pelton wheels; Parts or details peculiar thereto
- F03B 1/02 . Buckets; Bucket-carrying rotors
- F03B 1/04 . Nozzles (in general [B05B](#)); Nozzle-carrying members
- F03B 3/00** Machines or engines of reaction type; Parts or details peculiar thereto
- F03B 3/02 . with radial flow at high-pressure side and axial flow at low-pressure side of rotors, e.g. Francis turbines {(rotors per se [F03B 3/12C](#))}
- F03B 3/04 . with substantially axial flow throughout rotors, e.g. propeller turbines {(rotors per se [F03B 3/14D](#))}
- F03B 3/06 . . with adjustable blades, e.g. Kaplan turbines {(rotors per se [F03B 3/14](#))}
- F03B 3/08 . with pressure-velocity transformation exclusively in rotors
- F03B 3/10 . characterised by having means for functioning alternatively as pumps or turbines {starting [F03B 15/005](#)}
- F03B 3/103 . . {the same wheel acting as turbine wheel and as pump wheel}
- F03B 3/106 . . {the turbine wheel and the pumps wheel being mounted in adjacent positions on the same shaft in a single casing}
- F03B 3/12 . Blades; Blade-carrying rotors
- F03B 3/121 . . {Blades, their form or construction}

- F03B 3/123 . . . {specially designed as adjustable blades, e.g. for Kaplan-type turbines}
- F03B 3/125 . . {Rotors for radial flow at high-pressure side and axial flow at low-pressure side, e.g. for Francis-type turbines}
- F03B 3/126 . . {Rotors for essentially axial flow, e.g. for propeller turbines (with adjustable blades [F03B 3/14](#))}
- F03B 3/128 . . {Mounting, demounting}
- F03B 3/14 . . Rotors having adjustable blades {blade form or construction [F03B 3/123](#)}
- F03B 3/145 . . . {Mechanisms for adjusting the blades (if the regulation aspect is preponderant, see [F03B 15/00](#) and subgroups)}
  
- F03B 3/16 . Stators
- F03B 3/18 . . Stator blades; Guide conduits or vanes, e.g. adjustable {Conduits in dams or the like [F03B 13/08](#); arrangement of valves [F03B 11/004](#)}
- F03B 3/183 . . . {Adjustable vanes, e.g. wicket gates}
- F03B 3/186 . . . {Spiral or volute casings}
  
- F03B 5/00** **Machines or engines characterised by non-bladed rotors, e.g. serrated, using friction**
  
- F03B 7/00** **Water wheels** {of swinging flap type [F03B 17/06](#)}
  
- F03B 7/003 . {with buckets receiving the liquid}
- F03B 7/006 . { of the endless-chain type}
  
- F03B 9/00** **Endless-chain machines or engines**
  
- F03B 9/005 . {with buckets receiving the liquid}
  
- F03B 11/00** **Parts or details not provided for in, or of interest apart from, the preceding groups (controlling [F03B 15/00](#)), {e.g. wear-protection couplings, between turbine and generator}**
  
- F03B 11/002 . { Injecting air or other fluid ([F03D 11/0025](#), [F03B 11/04](#), [F03B 15/00](#) take precedence)}
- F03B 11/004 . {Valve arrangements ([F03B 3/10](#) takes precedence; adjustable wicket gates [F03B 3/183](#); valves in general [F16K](#))}
- F03B 11/006 . {Sealing arrangements ([F03B 3/14](#), [F03B 3/183](#), [F03B 13/083](#) takes precedence; sealings in general [F16J](#))}
- F03B 11/008 . {Measuring or testing arrangements (in general [G01](#))}
- F03B 11/02 . Casings {Spiral or volute casings [F03B 3/186](#)}
- F03B 11/025 . . {Covers}
- F03B 11/04 . for diminishing cavitation or vibration, e.g. balancing

- F03B 11/06 . Bearing arrangements
- F03B 11/063 .. {Arrangements for balancing axial thrust}
- F03B 11/066 ... {in vertical axis machines}
  
- F03B 11/08 . for removing foreign matter, e.g. mud
  
- F03B 13/00** **Adaptations of machines or engines for special use; Combinations of machines or engines with driving or driven apparatus** (if the apparatus aspects are predominant, see the relevant subclasses for such apparatus, e.g. [H02K 7/18](#)); **Power stations or aggregates** (incorporating only machines or engines of positive-displacement type [F03C](#); hydraulic engineering aspects [E02B](#); {combinations with wind energy converters [F03D 9/008](#)})
  
- F03B 13/02 . Adaptations for drilling wells
  
- F03B 13/04 . Adaptations for use in dentistry {for driving tools or the like having relatively small outer diameter, e.g. pipe cleaning tools}
  
- F03B 13/06 . Stations or aggregates of water-storage type, {e.g. comprising a turbine and a pump}(turbines characterised by having means for functioning alternatively as pumps [F03B 3/10](#))
  
- F03B 13/08 . Machine or engine aggregates in dams or the like; Conduits therefor, {e.g. diffusers (bulb groups [F03B 13/105](#))}
- F03B 13/083 .. {The generator rotor being mounted as turbine rotor rim}
- F03B 13/086 .. {Plants characterised by the use of siphons; their regulation (siphon weirs [E02B 7/18](#); siphons in general [F04F 10/00](#))}
  
- F03B 13/10 . Submerged units incorporating electric generators or motors
- F03B 13/105 .. {Bulb groups}
  
- F03B 13/12 . characterised by using wave or tide energy
- F03B 13/14 .. using wave energy
- F03B 13/141 ... {with a static energy collector}
- F03B 13/142 .... {which creates an oscillating water column}
- F03B 13/144 .... {which lifts water above sea level}
- F03B 13/145 ..... {for immediate use in an energy converter}
- F03B 13/147 ..... {for later use}
- F03B 13/148 ... {using the static pressure increase due to the wave}
- F03B 13/16 ... using the relative movement between a wave-operated member, {i.e. a "wom"} and another member, {i.e. a reaction member or "rem"}
- F03B 13/18 .... where the other member, {i.e. rem} is fixed, at least at one point, with respect to the sea bed or shore
- F03B 13/1805 ..... {and the wom is hinged to the rem}
- F03B 13/181 ..... {for limited rotation}
- F03B 13/1815 ..... {with an up-and-down movement}
- F03B 13/182 ..... {with a to-and-fro movement}

F03B 13/1825	.....	{for 360° rotation}
F03B 13/183	.....	{of a turbine-like wom}
F03B 13/1835	.....	{of an endless-belt type wom}
F03B 13/184	.....	{of a water-wheel type wom}
F03B 13/1845	.....	{and the wom slides relative to the rem}
F03B 13/185	.....	{not vertically}
F03B 13/1855	.....	{where the connection between wom and conversion system takes tension and compression ( <a href="#">F03B 13/187</a> , <a href="#">F03B 13/1875</a> take precedence)}
F03B 13/186	.....	{the connection being of the rack-and-pinion type}
F03B 13/1865	.....	{where the connection between wom and conversion system takes tension only ( <a href="#">F03B 13/187</a> , <a href="#">F03B 13/1875</a> take precedence)}
F03B 13/187	.....	{and the wom directly actuates the piston of a pump}
F03B 13/1875	.....	{and the wom is the piston or the cylinder in a pump}
F03B 13/188	.....	{and the wom is flexible or deformable}
F03B 13/1885	.....	{and the wom is tied to the rem}
F03B 13/189	.....	{acting directly on the piston of a pump}
F03B 13/1895	.....	{where the tie is a tension/compression member}
F03B 13/20	....	wherein both members {i.e. wom and rem} are movable relative to the sea bed or shore
F03B 13/22	...	using the flow of water resulting from wave movements to drive a motor or turbine {( <a href="#">F03B 13/144</a> takes precedence)}
F03B 13/24	...	to produce a flow of air, e.g. to drive an air turbine {( <a href="#">F03B 13/142</a> takes precedence)}
F03B 13/26	..	using tide energy
F03B 13/262	...	{using the relative movement between a tide-operated member and another member}
F03B 13/264	...	{using the horizontal flow of water resulting from tide movement}
F03B 13/266	...	{to compress air}
F03B 13/268	...	{making use of a dam}
<b>F03B 15/00</b>		<b>Controlling</b> (controlling in general G05){ regulation of plants characterised by the use of siphons <a href="#">F03B 13/086</a> }
F03B 15/005	.	{Starting, also of pump-turbines}
F03B 15/02	.	by varying liquid flow
F03B 15/04	..	of turbines (rotors having adjustable blades <a href="#">F03B 3/06</a> , <a href="#">F03B 3/14</a> ; adjustable guide vanes <a href="#">F03B 3/18</a> ; specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors <a href="#">F03B 15/20</a> )
F03B 15/06	...	Regulating, i.e. acting automatically
F03B 15/08	.....	by speed, e.g. by measuring electric frequency or liquid flow
F03B 15/10	.....	without retroactive action
F03B 15/12	.....	with retroactive action
F03B 15/14	....	by or of water level

- F03B 15/16 . . . . by power output
- F03B 15/18 . . . . for safety purposes, e.g. preventing over-speed
- F03B 15/20 . . specially adapted for turbines with jets of high-velocity liquid impinging on bladed or like rotors ([nozzles F03B 1/04](#))
- F03B 15/22 . . . for safety purposes

### **F03B 17/00 Other machines or engines**

- F03B 17/005 . { Installations wherein the liquid circulates in a closed loop ([F03B 13/06 takes precedence](#)); Alleged perpetua mobilia of this or similar kind ([perpetua mobilia using hydrostatic thrust or buoyancy F03B 17/04](#))}
- F03B 17/02 . using hydrostatic thrust
- F03B 17/025 . . {and reciprocating motion}
- F03B 17/04 . . Alleged perpetua mobilia {(with closed loop circulation or similar [F03B 17/005](#))}
- F03B 17/06 . using liquid flow {with predominantly kinetic energy conversion}, e.g. of swinging-flap type, {"run-of-river", "ultra-low head" ([F03B 13/264 takes precedence](#))}
- F03B 17/061 . . {with rotation axis substantially in flow direction}
- F03B 17/062 . . {with rotation axis substantially at right angle to flow direction}
- F03B 17/063 . . . {the flow engaging parts having no movement relative to the rotor during its rotation}
- F03B 17/064 . . . . {and a rotor of the endless-chain type}
- F03B 17/065 . . . {the flow engaging parts having a cyclic movement relative to the rotor during its rotation}
- F03B 17/066 . . . . {and a rotor of the endless-chain type}
- F03B 17/067 . . . . {the cyclic relative movement being positively coupled to the movement of rotation}
- F03B 17/068 . . . . . {and a rotor of the endless-chain type}